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# AMERICAN STATISTICAL ASSOCIATION.

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## COMPUTATION OF THE VALUE OF THE WEALTH IN EXISTENCE.

BY GEORGE K. HOLMES.

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The estimating the value of the wealth of the people of a country, or a portion of a country, is so difficult a matter that every attempt to do so has been more or less unsuccessful. Valuations by tax assessors are naturally inaccurate, and they are not only inaccurate but are extremely variable. It was determined by the Illinois Bureau of Labor Statistics,\* by examining the records of deeds of acre tracts, in which the amounts paid by purchasers were undoubtedly truly stated, that the assessors of Cook county, in which Chicago is situated, valued the acres, including improvements, at 7.26 per cent of their true value; while in Alexander county, in the southern and poorer part of the state, the acre tracts were valued at 94.46 per cent of their value. Varying undervaluations in that state and in all other states could be mentioned almost without limit.

Besides this error in assessors' statistics of the value of wealth there is a further one due to the escape from taxation

\* *Sixth Biennial Report*, 1890.

of personal property. Every state can furnish notorious evidence on this point.

For the purpose of arriving at the true value of real estate, a method that is commonly employed is to adopt some opinion as to the degree of under-valuation by assessors, and correspondingly raise the values given by them.

The United States Census, in estimating the true value of taxed real estate in 1890, sent out inquiries to county and municipal officers empowered to assess property for the purposes of taxation, asking them to state what, in their opinion, was the relation between the assessed and the true value of the real estate assessed by them. To corroborate their returns, more than 25,000 similar inquiries were sent throughout the country to persons believed to be familiar with the value of real estate in their respective regions, asking their opinion as to the relation, and the reports received were carefully considered in connection with the reports of the assessors. In estimating the value of taxed real estate by small civil divisions, as was done in this way, there was the advantage of offsetting plus against minus errors.

In other branches of the census work the value of farms was ascertained by enumerators, who accepted the statements of their owners. Owners' estimates were accepted for the purpose of ascertaining the value of farm implements and machines, live stock, mines and quarries, and the capital employed in manufactures. The value given to railroads and street railways and equipments represents the cost of construction and equipment of the roads. The value of canals and of telegraph and telephone property was determined by the capitalization of net receipts at 5 per cent.

The foregoing are the usual methods adopted for determining the value of the wealth of a country, and, when performed with the care and labor that were devoted to the matter by the Census Office, produce totals that are probably not far from the true ones. Statistics of the value of wealth obtained in these ways represent wealth largely in its geo-

graphical situation and not always in its place of ownership. It would be practically impossible to determine the value of wealth owned in any region by any direct statistical process, no matter what allowance might be made for errors.

An inexpensive, indirect method of determining the value of wealth in the region where owned has been employed by European statisticians, and this method adopts the number of years constituting a generation as a multiplier into the value of wealth left by persons who die within a year, with an estimate of the value of wealth changing hands by gift. The accepted length of a generation in France is about 36 years, and gifts among the living being left out of account, 36 times the value of the wealth left by the persons who die within a given year would establish approximately the value of the wealth of the people of the region within which the deceased lived. The theory of this is that, if those who die leave their wealth to their children, all wealth will pass to children during the average period that elapses from the time of the child's birth to the time of his parents' death. But of course wealth is not always left to children. This objection is answered by the claim that a generation approximately stands for the average age of persons who take by inheritance or bequest from persons who are not their parents.

In such a country as France the multiplier is probably considerably greater than 36, on account of the *dot*, and perhaps the more prevalent custom on the part of parents of giving children financial assistance than in this country. A multiplier obtained in this way is theoretically sound. The difficulty is to establish it with as much as approximate correctness. In this country the length of the generation has not been established, but it may be assumed, from a comparison of death rates and the average age at marriage, that it does not largely differ from 36 years.

Another indirect method that has been employed to establish the value of the wealth of the country is the use of the death rate; for instance, if the death rate is 20 in a thousand,

one-twentieth, or 50, is used as a multiplier upon the value of wealth left by those who die within a year. But, on the one hand, this ignores the high death rate of children, who are generally not owners of wealth, and, on the other hand, the still higher death rate of those who are 55 years old and over, a very large proportion of whom are owners of wealth.

The following table shows the death rates of various age periods in Massachusetts in 1890:—

DEATH RATES IN MASSACHUSETTS BY AGE PERIODS, 1890.

Age Periods.	Percentage of Deaths of Population.		
	Total.	For Males.	For Females.
Massachusetts.....	<b>1.94</b>	<b>2.00</b>	<b>1.89</b>
Under 25 years.....	1.83	1.94	1.72
25 to 29 ".....	0.87	0.89	0.85
30 to 34 ".....	1.00	1.01	1.00
35 to 39 ".....	1.08	1.07	1.10
40 to 44 ".....	1.22	1.21	1.23
45 to 49 ".....	1.48	1.49	1.48
50 to 55 ".....	1.78	1.90	1.67
55 to 59 ".....	2.40	2.53	2.29
60 years and over.....	6.20	6.40	6.02

The way is now prepared for offering a method of computing a multiplier, and, at the same time, of determining indirectly the length of a generation. The use of the death rate properly corrected and the use of the generation are both theoretically correct; and the two multipliers should agree if the death rate can be properly corrected and the length of a generation correctly determined. If we can only select the wealth owners from the population and from those who die, by age periods, a death rate of wealth owners can be computed. In the table next presented an attempt is made to do this:—

DEATH RATE OF FARM AND HOME OWNERS IN MASSACHUSETTS BY AGE PERIODS.  
1890.

Age Periods.	Population.	Deaths.	Percentage of Farm and Home Owners of Population.	Population Multiplied by Third Column.	Deaths Multiplied by Third Column.
Total.....	<b>2,238,943</b>	<b>43,538</b>	.....	<b>175,029</b>	<b>5,464</b>
Under 25 years.....	1,050,936	19,220	0.14	1,471	27
25 to 29 ".....	220,628	1,921	2.54	5,604	49
30 to 34 ".....	185,252	1,857	6.35	11,764	118
35 to 39 ".....	156,370	1,695	9.83	15,371	157
40 to 44 ".....	135,536	1,651	13.68	18,541	226
45 to 49 ".....	117,645	1,745	17.61	20,717	307
50 to 54 ".....	102,595	1,827	21.31	21,863	389
55 to 59 ".....	75,536	1,815	25.79	19,481	468
60 years and over....	187,944	11,648	32.04	60,217	3,723
Unknown.....	6,501	149	.....	.....	.....

$$\frac{5,464.00000}{175,029} = 31.22 = \text{death rate of farm and home owners.}$$

$$\frac{1,000.0000}{31.22} = 32.03 = \text{multiplier, without allowance for gifts.}$$

$$\frac{1,100.0000}{31.22} = 35.23 = \text{multiplier, with allowance for gifts, amounting to 10 per cent of estates left at death.}$$

The first two columns of the table explain themselves. The third column is obtained by dividing the farm and home owners of each age period in Massachusetts by the population of that age period, and representing the quotient as a percentage. The fourth column contains the farm and home owners who are equal to the product of the first and third columns. By multiplying the second column by the third the farm and home owners are selected from those who die during the year, and these are placed in the fifth column.

The assumption is that the owners of farms and homes own nearly all the wealth of the state, sufficiently so, at any rate, to make their death rate substantially the same as the death rate of all wealth owners. Therefore, the death rate of the wealth owners of Massachusetts is 31.22 per thousand, and this number divided into 1,000.0000 equals 32.03, which is

the sought for multiplier, without allowance for gifts. In other words, this is the length of a generation in Massachusetts.

I would make no great allowance for gifts in Massachusetts, nor anywhere in this country. It is not the practice to give a daughter a dowry, nor to help a son in business or otherwise financially by an outright gift. If a father advances wealth to a son he generally takes back a promissory note, and provides in his will that the debt shall be charged against the son's share of the estate, so that the debt goes into the probate court as assets.

Probably the most common and most considerable of gifts is that of a home by husband to wife. The census investigation of farm and home proprietorship throws some light upon this matter, and enables us to determine, probably without great error, the extent to which allowance for this gift should be made. It has been ascertained that 9.94 per cent of the farms that are occupied by owners in the United States are owned by women, and that, of the owned homes, women are the owners of 25.11 per cent. The percentages are a little higher for Massachusetts and the eastern states. It is a matter of observation that farmers, while living, rarely give their farms to their wives, and, if wives and other women inherit homes to about the same extent that they inherit farms, the difference between these two percentages will give the percentage of owned homes that were given to wives. I should regard this as the maximum percentage of wealth that changes hands by gift in this country, and consequently should adopt a smaller general average for correcting the multiplier, say 10 per cent; then by dividing 1,100.0000 by the death rate of the wealth owners, namely, 31.32, the multiplier, with allowance for gifts, is fixed at 35.23.

This multiplier may be applied to the value of the personal estates probated in the Orphan's Court of Baltimore. The *Third Annual Report of the Bureau of Industrial Statistics* of Maryland, recently issued, shows the value of these estates

for the six years 1888 to 1893, and the division of this number by 6 gives \$9,842,595 as the average yearly amount. If this is multiplied by 35.23 the product is \$346,754,622, which, according to the computation, stands for the value of the personal property owned in Baltimore, including, doubtless, much personal property situated outside of that city, and not necessarily including all of the personal property situated within the city. This large number indicates that the multiplier is none too small. The assessed valuation of personal property in 1890 was \$68,696,614, so that if the correct value of the personal property owned in Baltimore has been reached by the computations, \$278,058,008 of personal property escaped taxation, partly by under-valuation, but, as it seems, mostly by entirely escaping assessment.

The results contained in this paper are offered for no more than they are worth, and are intended to be suggestive instead of conclusive.

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#### REMARKS OF MR. EDWARD ATKINSON.

I have given some attention to the various methods which have been adopted to determine the wealth of a state or nation by measuring it at so many dollars worth, and I have finally come to the conclusion that all these computations partake of the nature of statistical rubbish. I do not use this term as a stigma. I doubt not that Mr. Upton's compilations of the wealth of the United States are as close to the mark as it is possible to make them, but even if we had positive assurance that they were exact, *cui bono*?

In the first place, the valuation of land is included without separation from the improvements upon it. We therefore have no clue to the accumulation of capital. We have no means of discriminating between the valuation which is due to the land having been cleared and put under productive cultivation and the price which is paid in cities for the mere choice of lots.

In the second place, no valuation is or can be put upon public highways, although, as I understand the case, public buildings are included. If one, why not the other?